

## RISK RADAR – SECURITY AND RELIABILITY RISKS

## SECURITY AND RELIABILITY COUNCIL

This paper is to help the SRC brainstorm about electricity industry risks with the objective of ensuring that they spend their time dealing with the most consequential matters that could manifest over a mix of timeframes.

**Note:** This paper has been prepared for the purpose of the Security and Reliability Council (SRC). Content should not be interpreted as representing the views or policy of the Electricity Authority.

## Risk Radar - security and reliability risks

### 1. Purpose and background

- 1.1. This paper presents the latest version of the SRC's risk radar (Table 1). The risk radar supports the SRC to triage their time and attention in a risk-based way.
- 1.2. Risks are sorted into three categories:
  - a) risks that could manifest within one year.
  - b) risks that could manifest within more than one year.
  - c) persistent risks that could manifest at any time.
- 1.3. The secretariat proposes combining the previous medium term (one to five years) and long term (more than five years) categories. This reduces the number of columns to three, making the table easier to read,
- 1.4. Within each category, risks are ordered by the SRC secretariat's rough estimation of consequence and likelihood, however this may change over time, and the order may not represent the current priorities.

### 2. Changes since the previous version

- 2.1 There are significant changes proposed for the risk radar, arising from the SRC's August risk and strategy session. There are changes to both layout and content, based on feedback from members.
- 2.2 The secretariat incorporated member-feedback into a revised risk radar, with the aim to:
  - Reduce duplication of stated risks
  - More clearly set out cause and effect for each risk
  - Cluster items, as appropriate
- 2.3 As circulated to members prior to the meeting, the secretariat proposes a potential new layout and approach to the risk radar to make it a more effective tool. Proposed changes include:
  - Merging medium- and long-term risks
  - Use of a cause-and-effect layout
  - Reduced wording, using a headline approach
  - adding a 'cause and effect' table in a spreadsheet layout, to assist members' analysis of risks
  - including a (viewable but non-editable) spreadsheet version in the Diligent resource centre
- 2.4 Examples of the reduced wording and cause and effect layout are included at the end of this document.
- 2.5 Because of these significant proposed changes, the secretariat's usual approach to noting additions to the register using **red** and **strikethrough**, has been paused for this meeting. For the risk radar in Appendix A, it is proposed

the text in red replaces the text in black. This would significantly shorten the table.

### 3. Questions for the SRC to consider

3.1 The SRC may wish to consider the following questions.

- Q1. Is the SRC comfortable to append a version of the risk radar in some format (tbc) in its minutes for each meeting?**
- Q2. Is the SRC comfortable with the changes proposed to the risk radar, and the addition of the 'cause and effect' table in Diligent?**
- Q3. What content changes would the SRC like made to this risk radar for the next meeting?**
- Q4. What further information, if any, does the SRC wish to have provided to it by the secretariat?**
- Q5. What advice, if any, does the SRC wish to provide to the Authority?**

**SRC Risk Radar – Cause and Effect layout**

Cause	Effect	Horizon	Comments
Cyber attack	Damages system assets	P	
Reduced gas supply	Reduced generation	P	
Physical attack	Damaged system assets	P	
Pandemic	Reduced workforce, restricted travel	P	
Insufficient collaboration	Increased costs, reduces reliability	P	
Less live work	Increased outages	P	
Social media	Personnel/asset attacks	P	
Government policy misaligned with industry objectives	Reduced investment and confidence & reduced water for hydro output	P	
Natural disaster	Damaged system assets	P	A resilience issue
Increased small scale DG	Network congestion	P	
Weather events	Increased outages	P	
Inadequate AUFLS	Blackouts	P	
Increased intermittency	Reduced capacity and flexibility at peaks	S	State the capacity issue, ie 'reduced capacity'
Delayed tree regulations	Increased outages	S	
Poor extended reserve implementation	Increased blackouts	S	
Regulator strategic priorities misaligned with industry objectives	Reduced investment and confidence	S	
Commerce Commission regulations	Inhibits investment	S	
Supply chain	Reduced goods/services	S	
Fragmented government approach	Delays	S	
Dry Year	Increased prices and emissions & reduced market confidence and investment	S	
Inefficient market response	Insufficient generation	L	Currently says: 'to major demand changes'
Ageing assets	Increased failures	L	
Over-reliance on AI and automation	Reduced emergency human input	L	Inadequate response leading to outages
Early thermal exit	Reduced capacity and flexibility	L	Currently says: 'before suitable replacement'
Lack of thermal	Reduced capacity and flexibility	L	
Poor/unenforced standards	Reduced power quality	L	Through noncompliance
Demand increases outpace generation capacity increases	Causing outages	L	
Ageing/emigrating workforce	Reduced institutional knowledge and people available to plan, design and build	L	
Insufficient DER uptake	Network instability	L	
EV uptake	Undermined LV network stability	L	
Stranded asset costs	Reduced network viability	L	
Generation market	Reduced capacity and flexibility	L	
Simultaneous asset replacement	Reduced asset availability	L	

**Table 1: Risk radar - security and reliability risks**

This table sets out the risks, as discussed at each meeting. The risks are not listed in priority/rank order

<b>Short term</b> Within 1 year	<b>Long term</b> More than 1 year	<b>Persistent</b> Could arise at any time
<p>S1: the risk of a growing disconnect between energy and capacity issues due to more intermittent renewables (without adequate firming) causing more regular industry disruption and could result in unplanned outages (e.g.,9 August 2021).</p> <p><b>Increased intermittency causing reduced capacity at peaks</b></p>	<p>L1: Inefficient market response to significant industrial demand reductions (eg Tiwai exit).</p> <p><b>Inefficient market response to demand causes insufficient generation</b></p>	<p>P1: Cyber-attack damages power system assets and/or cuts supply, for example Waikato DHB and Colonial Pipeline (both 2021), or breaches data security - Pinnacle Midlands Health Network (2022).</p> <p><b>Cyber-attack damages system assets</b></p>
<p>S2: The prospect of Dry winter / official conservation campaign increasing prices and carbon emissions through increased thermal generation and as the risk becomes realised there is likely to be supply reductions both voluntary and mandatory.</p> <p><b>Dry year increases prices and emissions</b></p>	<p>L2: Continued delay to the Review of 'Tree Regs' increases risk of damage and blackouts due to tree interference with lines.</p> <p><b>Delayed tree regulations review increases outages</b></p>	<p>P2: Gas supply running down (in part due to exploration uncertainty) reduces generation adequacy and availability.</p> <p><b>Reduced gas supply causes reduced generation</b></p>

<b>Short term</b> Within 1 year	<b>Long term</b> More than 1 year	<b>Persistent</b> Could arise at any time
<p>S3: Market confidence reduced by the pain from high prices and security of supply (dry year) causing regulatory intervention impacting on investor's willingness to invest long-term in assets for de-carbonisation.</p> <p><b>Dry year reduces market confidence and investment</b></p>	<p>L3: Aspirational Government carbon goals leading to early thermal exit potentially causing reduced reliability and security of supply, if capability and ambition are misaligned.</p> <p><b>Early thermal exit before suitable replacement</b></p>	<p>P3: Physical attack (war, terrorism, sabotage, and political unrest/protest) damages power system assets and/or cuts supply.</p> <p><b>Physical attack damages system assets</b></p>
<p>S4: Black out risk rises if the transition from the current two-block to a four-block extended reserve scheme is delayed/poorly implemented.</p> <p><b>Poor extended reserve implementation causes increased blackouts</b></p>	<p>L4: Lack of thermal generation (Huntly, Taranaki - both existence and availability) for its firming role adversely affecting reliability and security.</p> <p><b>Lack of thermal reduces capacity and flexibility</b></p>	<p>P4: Natural disaster damages power system assets and/or cuts supply.</p> <p><b>Natural disaster damages system assets</b></p>
<p>S5: Reduced output from hydro due to changes in generation output arising from the National Policy Statement on freshwater management.</p> <p><b>Government water policy reduces hydro output</b></p>	<p>L5: Poor standards governance and enforcement permits inadequate standards and/or significant non-compliance of equipment against standards.</p>	<p>P5: National or international pandemic harms access to:</p> <ul style="list-style-type: none"> <li>a) the availability of imported goods/services</li> <li>b) international specialists</li> </ul> <p>and reduces ability for work crews to travel domestically.</p>

<b>Short term</b> Within 1 year	<b>Long term</b> More than 1 year	<b>Persistent</b> Could arise at any time
	<p><b>Poor/unenforced standards causes reduced power quality</b></p>	<p><b>Pandemic reduces workforce and restricts travel</b></p>
<p>S6: Reduction in investment confidence due to uncertainty about how Electricity Price Review conclusions and other Government policy interventions (eg Onslow pumped hydro) will be implemented.</p> <p><b>Government policy misaligned with industry objectives reduces investment and confidence</b></p>	<p>L6: Increased peak demand on some LV networks from electric vehicles causes localised supply outages and potential network damage and unnecessary network investment.</p> <p><b>EV uptake undermines LV network stability</b></p>	<p>P6: Insufficient information sharing and planning amongst industry participants in relation to reliability of supply risks increases costs and reduces reliability.</p> <p><b>Insufficient collaboration increases costs, reduces reliability</b></p>

<b>Short term</b> Within 1 year	<b>Long term</b> More than 1 year	<b>Persistent</b> Could arise at any time
<p>S7: Unsignalled or quickly changing strategic priorities of the regulator increases investment uncertainty for industry participants.</p> <p><b>Regulator strategic priorities undermines misaligned with industry objectives reduces investment and confidence</b></p>	<p>L7: Commerce Commission's regulatory control period #3 (April 2020-March 2025) impacts on reliability and asset health by inhibiting investment.</p> <p><b>Commerce Commission regulation inhibits investment</b></p>	<p>P7: Changes in industry live line and supply restoration operating guidelines, for example continued reluctance to use live line techniques for suitable work, lead to reduced supply reliability performance through increased planned outages.</p> <p><b>Less live line work increases outages</b></p>
<p>S8: Unreliable social media commentary impacting on assets or personnel in the industry (e.g. critical comments inciting physical attacks on repair personnel, equipment or thermal fuel deliveries).</p> <p><b>Social media causing personnel/asset attacks</b></p>	<p>L8: Generation market structure not aligning with or reacting to physical structural change, reducing investment incentives, e.g. pumped hydro, thermal decommissioning, and the transition to 100% renewables.</p> <p><b>Generation market misaligned with policy changes</b></p>	<p>P8: AUFLS is not set per the current Code requirements potentially causing blackouts if AUFLS does not arrest frequency drop.</p> <p><b>Inadequate AUFLS leads to blackouts</b></p>



<b>Short term</b> Within 1 year	<b>Long term</b> More than 1 year	<b>Persistent</b> Could arise at any time
<p>S9: Ongoing fallout from COVID-19 and the Russian annexation of Ukraine harms industry's:</p> <ul style="list-style-type: none"> <li>a) personnel capability/travel.</li> <li>b) availability and increased prices of imported goods/services.</li> </ul> <p>general level of preparedness and responsiveness for managing incidents, and the potential impact on critical industry plant such as generating stations and control rooms; and the ability to get enough critical expertise into the country with the aggregate impacts of supply chain issues, a growing economy and big investments.</p> <p><b>Supply chain issues impact goods/services</b></p>	<p>L9: Impact of increased climate and weather-related events causes an increase in severity and frequency of network and transmission outages.</p> <p><b>Weather events cause increased outages</b></p>	<p>P9: LV network congestion, due to rapid increase in small scale distributed generation, increasing likelihood of network damage and unplanned outages.</p> <p><b>Increased small scale distributed generation congests networks</b></p>

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<p>S10: Risk of lack of preparedness for the ongoing fallout from COVID-19 and the Russian annexation of Ukraine causing further economic hardship (with consequent impact on potential reduction in maintenance).</p> <p><b>Supply chain issues impact hardship/maintenance</b></p>	<p>L10: Simultaneous replacement across multiple networks of ageing assets causing resource and supply chain issues, reducing security and reliability of supply.</p> <p><b>Simultaneous asset replacement reduces availability</b></p>	<p>P10: Unplanned gas supply interruption may limit gas fired thermals' ability to generate.</p> <p><b>Gas supply interruption limits thermal generation</b></p>
<p>S11: Diffuse or fragmented responsibilities across government entities makes it harder to get alignment, leading to inefficiencies or delays in strategies and critical system security workstreams.</p> <p><b>Fragmented government approach causes delays</b></p>	<p>L11: Generator investor incentives weakened due to uncertainty, for example, arising from Tiwai closure and central government investigation into solutions to dry-year risk such as pumped hydro storage.</p> <p><b>Government policy undermines investor uncertainty</b></p>	

<b>Short term</b> Within 1 year	<b>Long term</b> More than 1 year	<b>Persistent</b> Could arise at any time
	<p>L12: Ageing and/or under-invested generation, distribution, and transmission assets lead to increased failures.</p> <p><b>Ageing assets leads to increased failures</b></p>	
	<p>L13: The increasing dependence on artificial intelligence (AI) and automation reduces the industry's ability to deal with unusual and unexpected critical issues (in real time or to quickly recover)</p> <p><b>AI and automation reduces emergency human input</b></p>	
	<p>L14: Undersized generation fleet due to demand growth from greater electrification (without adequate demand response) exceeds generation capacity causing unplanned outages.</p>	

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	<b>Demand increases outpace generation capacity increases</b>	
	<p>L15: Loss of industry knowledge and capability through an aging workforce and younger people moving overseas.</p> <p><b>Ageing/emigrating workforce reduces institutional knowledge and personnel to plan, design and build</b></p>	
	<p>L16: Reliability treated less like a public good as new technology makes it more customisable and left to individual response, which causes an unstable system if individuals don't take up DER.</p> <p><b>Insufficient DER uptake causes network instability</b></p>	
	<p>L17: the risk of stranded assets increasing the cost for those left using them (the</p>	

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	<p>“death spiral”) becoming increasingly apparent making networks commercially unviable.</p> <p><b>Stranded asset costs reduce network viability</b></p>	

